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(54) APPARATUS FOR CONTRACTING, LOADING OR CRIMPING SELF-EXPANDING AND BALLOON EXPANDABLE STENT DEVICES

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- (51) **Int. Cl.**⁷ **B23P 21/00**; B23P 11/00

(56) References Cited

U.S. PATENT DOCUMENTS

| 565,257 A | 8/1896 | Boyd 72/402 |
|-------------|-----------|-------------------------|
| 758,195 A | 4/1904 | Schweinert et al 72/402 |
| 1,665,915 A | * 4/1928 | Ekman 72/402 |
| 1,889,795 A | * 12/1932 | Smith et al 72/402 |
| 2,292,421 A | * 8/1942 | Wolf 72/402 |
| 2,751,077 A | 6/1956 | Latin et al 207/4 |
| 2,887,222 A | * 5/1959 | Latin et al 72/121 |
| 2,986,192 A | 5/1961 | Macleod 153/1 |

| 3,084,389 A | * 4/1963 | Doyle 264/522 |
|-------------|----------|-------------------------|
| 3,416,352 A | | Ribback 72/121 |
| 3,664,213 A | | Anati |
| 3.695.087 A | | Tuberman 72/402 |
| 3,731,518 A | | Blocher 72/402 |
| 4,164,523 A | | Hanning 264/28 |
| 4,413,989 A | 11/1983 | Schjeldahl et al 604/96 |
| 4,434,645 A | 3/1984 | Svercl et al 72/402 |
| 4,456,000 A | 6/1984 | Schjeldahl et al 128/1 |
| 4,490,421 A | 12/1984 | Levy 428/35 |

(Continued)

FOREIGN PATENT DOCUMENTS

| DE | 295 06 654.7 | 7/1995 |
|----|---------------|---------|
| DE | 195 32 288 A1 | 3/1997 |
| EP | 0 630 623 A2 | 12/1994 |
| EP | 0 701 800 A1 | 3/1996 |
| EP | 935 952 A2 | 8/1999 |
| WO | 90/00098 | 1/1990 |
| WO | 96/03092 | 2/1996 |
| WO | 97/20593 | 12/1997 |
| WO | 98/19633 | 5/1998 |

OTHER PUBLICATIONS

U.S. Appl. No. 09/966,686, Austin, filed Oct. 1, 2001. Hawley's Condensed Chemical Dictionary, p. 873, 1993. U.S. Appl. No. 09/401,218, Austin, filed Sep. 22, 1999.

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(57) ABSTRACT

An apparatus for manipulating a medical device is formed of at least three coupled movable blades which are disposed about a reference circle to form an aperture whose size may be varied. The aperture capable of being sized to contain a medical device. Each blade is in communication with an actuation device which is capable of moving the blade to alter the size of the aperture. Each blade includes a single radial point which a) lies on the circumference of the reference circle prior to movement of the blade, and b) may be moved only along a radius of the reference circle on movement of the blade.

40 Claims, 15 Drawing Sheets

